

WHAT IS CLAIMED IS:

1. A substantially pure neuronal nicotinic acetylcholine receptor comprising at least one agonist binding subunit and at least one non-agonist binding subunit wherein said agonist binding subunit is selected from the group consisting of neuronal nicotinic acetylcholine receptor subunits alpha2, alpha3, alpha4 and alpha5, and said non-agonist binding subunit is selected from the group consisting of neuronal nicotinic acetylcholine receptor subunits beta2, beta3 and beta4.

2. A substantially pure neuronal nicotinic acetylcholine receptor of Claim 1 wherein said alpha subunit(s) are encoded by alpha gene sequences selected from the group consisting of: pHP16, ATCC No. 67646, which encodes alpha2; pPCA48, ATCC No. 67642, which encodes alpha3; pHYA23-1(E)1, ATCC No. 67644, which encodes alpha4.1; pHIP3C(E)3, ATCC No. 67645, which encodes alpha4.2; and PC1321, ATCC No. (67652), which encodes alpha5; and said beta subunit(s) are encoded by beta gene sequences selected from the group consisting of: pPCX49, ATCC No. 67643, which encodes beta2; ESD76, ATCC No. 67653, which encodes beta3, and pZPC13, ATCC No. 67893, which encodes beta4.

3. A substantially pure neuronal nicotinic acetylcholine receptor comprising at least one alpha receptor subunit and at least one beta subunit, wherein said alpha receptor subunit(s) are selected from the group consisting of alpha2, alpha3, and alpha4, and said beta subunit(s) are selected from the group consisting of beta2 and beta4.

4. A substantially pure neuronal nicotinic acetylcholine receptor of Claim 3 wherein said alpha subunit(s) are encoded by alpha gene sequences selected from the group consisting of: pHPY16, ATCC No. 67646, which encodes alpha2; pPCA48, ATCC No. 67642, which encodes alpha3; pHYA23-1(E)1, ATCC No. 67644, which encodes alpha4.1; pHIP3C(E)3, ATCC No. 67645, which encodes alpha4.2; and said beta subunit(s) are encoded by beta gene sequences selected from the group consisting of pPCX49, ATCC No. 67643, which encodes beta2 and pZPC13, ATCC 67893, which encodes beta4.

5. A substantially pure double-stranded DNA wherein the sense strand encodes the the primary amino acid sequence of a neuronal nicotinic acetylcholine receptor polypeptide selected from the group consisting of alpha2, alpha4, alpha5, beta2, beta3 and beta4.

6. A substantially pure double-stranded DNA of Claim 5 wherein said alpha subunit(s) are encoded by DNA sequences selected from the group consisting of pHPY16, ATCC No. 67646, which encodes alpha2; pPCA48, ATCC No. 67642, which encodes alpha3; pHYA23-1(E)1, ATCC No. 67644, which encodes alpha4.1; pHIP3C(E)3, ATCC No. 67645, which encodes alpha4.2; and PC1321, ATCC No. (67652), which encodes alpha5; and said beta subunit(s) are encoded by DNA sequences selected from the group consisting of pPCX49, ATCC No. 67643, which encodes beta2; ESD76, ATCC No. 67653, which encodes beta3, and pZPC13, ATCC No. 67893, which encodes beta4.

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7. Substantially pure DNA sequences selected from the group consisting of DNA sequences shown in Figures 2A(1), 2A(2), 2A(3) (for alpha4.1); Figures 2B(1), 2B(2), 2B(3) (for alpha4.2); Figures 7B(1), 7B(2), 7B(3) (for beta2); Figures 15C(1), 15C(2), 15C(3) (for alpha2); Figure 19 (for beta3); Figure 24 (for beta4); and Figure 25 (for alpha5).

8. Substantially pure DNA sequences that are functionally equivalent to any of the
- 10 substantially pure DNA sequences selected from the group consisting of: pHYPL6, ATCC No. 67646, which encodes alpha2; pHYA23-1(E)1, ATCC No. 67644, which encodes alpha4.1; pHIP3C(E)3, ATCC No. 67645, which encodes alpha4.2; PC1321, ATCC No. 67652, which
- 15 encodes alpha5; pPCX49, ATCC No. 67643, which encodes beta2; ESD76, ATCC No. 67653, which encodes beta3, and pZPC13, ATCC No. 67893, which encodes beta4.

9. Substantially pure DNA sequences that are functionally equivalent to any of the
- 20 substantially pure DNA sequences shown in Figures 2A(1), 2A(2), 2A(3) (for alpha4.1); Figures 2B(1), 2B(2), 2B(3) (for alpha4.2); Figures 7B(1), 7B(2), 7B(3) (for beta2); Figures 15C(1), 15C(2), 15C(3) (for alpha2); Figure 19 (for beta3); Figure 24 (for beta4);
- 25 and Figure 25 (for alpha5).

10. Substantially pure protein comprised of an amino acid sequence selected from the group consisting of those amino acid sequences shown in Figures 2A(1), 2A(2), 2A(3) (for alpha4.1); Figures
- 30 2B(1), 2B(2), 2B(3) (for alpha4.2); Figures 7B(1), 7B(2), 7B(3) (for beta2); Figures 15C(1), 15C(2), 15C(3) (for alpha2); Figure 19 (for beta3); Figure 24 (for beta4); and Figure 25 (for alpha5).

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11. DNA sequences having substantial sequence homology with any of the DNAs claimed in any of Claims 5-10.

12. mRNA sequences transcribed from any of the substantially pure DNA sequences claimed in any of Claims of 5-10.

13. Substantially pure polypeptide encoded by any of the substantially pure DNA sequences claimed in any of Claims 5-10.

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14. Cells transformed by any of the substantially pure DNA sequences claimed in any of Claims 5-10.

*add A5*

*add B4*